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APPLICATION FOR UNITED STATES LETTERS PATENT

INVENTORS:

Katsumi Kato
Tadamitsu Sato

TITLE:

Controller Capable of Operating
Plural Operation Objects by
Switching Display of Operation
Surface of Operation Member

ATTORNEY:

Gustavo Siller, Jr.
BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, ILLINOIS 60610
(312) 321-4200

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1. Field of the Invention

2. Description of the Related Art

Recently, with the increasing popularity of the Internet, controllers have appeared which enable the browsing of home pages (web pages) and transmission and reception of mail by using the screen of a television receiver. This type of controller is provided with an input mechanism to be used for mail operation, in addition to the input mechanism for selecting a channel. During mail operation, a key arrangement of a keyboard device is displayed on, for example, the television screen, and the

Alternatively a bar code may be formed, and the type of the display sheet determined by the determination mechanism.

The display member may be a display panel capable of switching display contents, and an input portion and/or an input item displayed on the display panel may be switched in accordance with a switching signal supplied from the host to the operation member.

Only basic input portions may be displayed on the display panel, and when the functions are to be switched, the above-mentioned display sheet may further be overlaid on the display panel, so that an operation is performed.

The above and further objects, aspects and novel features of the invention will become more fully apparent from the following detailed description when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic perspective view showing an operation member used in a controller according to the present invention;

Fig. 2 is a functional block diagram showing the controller according to the present invention;

Fig. 3 is a schematic perspective view showing another operation member used in the controller according to the present invention; and

Fig. 4 is a functional block diagram showing the controller according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 is a schematic view showing an example of a controller according to the present invention. Fig. 2 is a functional block diagram showing the controller according to the present invention.

A controller 1 shown in Fig. 1 is designed to enable wireless communication by radio waves between a host (television receiver) 20 and an operation member 2. By operating the operation member 2, a plurality of functions provided in the host 20 can be controlled. Examples of the functions include the browsing of home pages, and transmission and reception of mail, in addition to television programs and movies displays normally displayed on a television screen, but are not limited thereto. Wireless communication by optical communication, such as via infrared light, may also be performed between the operation member 2 and the host 20.

The operation member 2 is made of a resin box-type case 2a, and a rectangular cutout portion 3 is formed on the operation surface side (the obverse surface) of the case 2a. A planar input device 4 (or input mechanism) is mounted in the cutout portion 3. The planar input device 4 can detect an input coordinate position. Examples of the types of detectors that may be mounted in the planar input device 4 include a pressure-sensitive-type, X-Y-axis contact-type, and electrostatic-type pad.

A pressure-sensitive-type pad is one in which a pair of resistance sheets are arranged facing each other with a very small space therebetween. X-axis electrodes are formed on both ends of one of the resistance sheets, and Y-axis electrodes are formed on both ends of the other resistance sheet. The coordinate position is detected by measuring a voltage applied between the X-axis electrode and the Y-axis electrode, which is generated when the pad is pushed in, causing the respective sheets to be brought into contact with each other. An X-Y-axis contact-type pad is one in which X-axis electrodes and Y-axis electrodes are arranged in a matrix, and in which a coordinate position is detected by sequentially supplying electrical current to the X-axis electrodes and by detecting a signal output from the Y-axis electrodes. An electrostatic-type pad is one in which X-axis electrodes and Y-axis electrodes are provided facing each other at right angles to each other with an insulating sheet therebetween, and in which a coordinate position is detected by determining the change in electrostatic capacity on the pad surface which is generated when the operator touches the pad.

An elongated insertion opening 5 is provided on one side of the case 2a, and a display sheet 6 as a display member is attached/detached via this insertion opening 5. The display sheet 6 is made of a flexible resin and the sheet is overlaid on the planar input device 4. The insertion opening 5 permits different display sheets 6 to be

circuit completion structures.

Although in the determination mechanism 8, the determination of the display sheet 6 is made according to the position of the cutout, if the display sheets 6 to be attached and detached are of two types, the determination may be made based on whether or not there is a cutout. As a result of the foregoing, when the light-receiving section detects light only at the position of the cutout 6a, the determination mechanism 8 determines that the display sheet 6A is attached, and when light is detected only at the position of the cutout 6b, the determination mechanism 8 determines that the display sheet 6B is attached.

In addition to the determination of the display sheet 6A and the display sheet 6B, when a state in which light is received at both the positions of the cutouts 6a and 6b and a state in which light is not received at either position are set, the determination of a total of four kinds of sheets can be made.

As shown in Fig. 2, the operation member 2 is provided with a control section 10. The planar input device 4, the determination mechanism 8, a transmission section 11, a receiving section 12, and a memory 13 are connected to the control section 10. Meanwhile, the host 20 on the television receiver side is provided with a CPU 21 to which a receiving section 22, a transmission section 23, a memory 24, and a display section 25 are connected.

In the operation member 2 formed in the above-described

manner, the display sheet 6A or the display sheet 6B is inserted via the insertion opening 5. The display sheets 6A and 6B are inserted up to a position where the input portions and the input items can be seen from within the frame formed of the cutout portion 3, and are inserted up to a position where the display sheets 6A and 6B can be determined by the determination mechanism 8.

When the operation member 2 is to be used for selecting a television channel, the display sheet 6A is attached via the insertion opening 5. As a result, the determination mechanism 8 detects the cutout 6a and determines that the display sheet 6A is attached. At this time, a determination signal indicating that the display sheet 6A is attached is sent to the control section 10, and in the control section 10, a transmission signal corresponding to the display sheet 6A overlaid on the planar input device 4 is generated.

As a result of the above, for example, when the display of "channel 1" is pressed from above the display sheet 6A, only the portion of "channel 1" formed on the display sheet 6A is flexed, and the pressing-in force at this time causes the planar input device 4 overlaid below the display sheet 6A to be pressed. As a result, the coordinate position is detected by the planar input device 4, and data indicating this coordinate position is sent to the control section 10. In the control section 10, it is recognized that the position at which the planar input device 4 is operated is pressed in the portion of the display of "channel 1" on the

basis of the data indicating the coordinate position, and a transmission signal corresponding to the display is generated. At this time, the transmission signal corresponding to "channel 1" may be read from the memory 13 in accordance with the data indicating the coordinate position. The transmission signal is transmitted to the host 20 via the transmission section 11. In the receiving section 22 of the host 20, the transmission signal is received, and control for switching the screen of the display section 25 to "channel 1" is performed by the CPU 21 provided in the host 20.

When an operation key formed on the display sheet 6A for adjusting sound volume is pressed, a transmission signal for changing the sound volume is generated based on the input data of the coordinate position, and a predetermined process is performed by the host 20.

In the host 20, when the display section 25 is changed from the channel switch function, etc. on the television screen to the function of transmitting and receiving mail, and the screen for transmitting and receiving mail is displayed on the display section 25, the display sheet 6A is removed from the case 2a, and the display sheet 6B is attached. At this time, in the determination mechanism 8, the cutout 6b is detected, and a transmission signal indicating that the display sheet 6B is attached is sent to the control section 10. In the control section 10, the operation input from the planar input device 4 is switched

with a thin display panel 32 formed of a liquid-crystal panel, an electroluminescent (EL) display panel, or the like on the surface of a case 31a. The display panel 32 changes the input portions and the input items displayed such that the display panel 32 becomes an operation surface for selecting a channel on a television screen or an operation surface for transmitting and receiving mail, but is not limited thereto. Also, this display panel 32 is such that the surface thereof becomes a surface on which an operation is performed, and as a result of the operation surface being pressed by a finger, a pen, etc., a predetermined transmission signal corresponding to the operation surface is generated.

For example, a liquid-crystal panel is laminated as the display panel 32 on the planar input device 4 shown in Fig. 1, and the input portions and the input items are displayed on the display panel 32. Then, when the display panel 32 is pressed, a predetermined portion of the planar input device 4 is indicated. For example, when the planar input device 4 is a pressure-sensitive type, the display panel 32 is deformed, causing a predetermined portion of the planar input device 4 to be pressed. Also, when the planar input device 4 is an electrostatic type, a coordinate can be input by the planar input device 4 by touching the display panel 32 with a conductor, such as a finger.

As shown in Fig. 4, the operation member 31 is provided with a control section 33. The display panel 32, a

transmission section 34, a receiving section 35, and a memory 36 are connected to the control section 33.

In the host 20, when the display section 25 is switched to a television screen, display data (image data) is read from the memory 24 under the control of the CPU 21 and is transmitted from the transmission section 23 to the operation member 31. In the operation member 31, the display data is received by the receiving section 35, and the display of the display panel 32 is switched to that for selecting a channel or for adjusting a sound volume under the control of the control section 33. Also, when the display section 25 is switched to that for transmitting and receiving mail, in the CPU 21, display data for inputting characters, etc., shown on the display sheet 6B of Fig. 1, is loaded from the memory 24, and is transmitted to the operation member 31. In the operation member 31, the display data is transmitted to the display panel 32 by the control section 33, and the display of the display panel 32 is switched to that for inputting characters, etc.

The display data may be stored within the memory 36 of the operation member 31. For the switching of the display of the display panel 32 in this case, a specific code number corresponding to the input portion or the input item displayed on the display panel 32 is transmitted from the host 20 to the operation member 31. In the operation member 31, the code number is received, and the display data corresponding to the received code number may be read from

